AMENDMENTS TO THE CLAIMS

Please amend claims 1, 4, 5 and 12, cancel claims 16-21; and add claims 22-23, such that the status of the claims is as follows:

1.(currently amended) ~~In a~~ A modeling machine of the type which builds three-dimensional objects by depositing thermally solidifiable modeling material as a road of molten material having a height *h* into a build environment having a temperature lower than an extrudate temperature of the material, and from an extrusion head that moves at a known speed in a predetermined cross-sectional pattern, ~~the improvement~~ comprising:

a first supply of a first thermally solidifiable modeling material, in the form of a continuous filament;

a second supply of a second thermally solidifiable modeling material, in the form of a continuous filament;

a first dispenser carried by the extrusion head and having an inlet for receiving ~~a~~ the first supply of the first thermally solidifiable modeling material and a tip for dispensing roads of the first material in molten form, the tip of the first dispenser having a downward face positioned in approximately a z-plane; and

a second dispenser carried by the extrusion head and having an inlet for receiving ~~a~~ the second supply of the second thermally solidifiable modeling material and a tip for dispensing roads of the second material in molten form, the tip of the second dispenser being maintained in a fixed vertical position relative to the tip of the first dispenser, and having a downward face spaced apart a distance *s* from the face of the first dispenser and positioned in approximately the same z-plane as the face of the first dispenser;

wherein the distance *s* is great enough that a road deposited by one of the tips will shrink due exclusively to cooling during a minimum transit time Δt between

the tips such that the other one of the tips does not drag across and smear the road.

2.(original) The modeling machine of claim 1, wherein the road has a thermal diffusivity K_e, and wherein the minimum transit time is characterized by the relationship $\Delta t = \frac{0.3h^2}{K_e}$.

3.(original) The modeling machine of claim 2, wherein the extrusion head accelerates and decelerates through a path comprising multiple vertices and the tips have a minimum vertex velocity v_{min} and a maximum acceleration a_{max}, and wherein the spacing s is characterized by the relationship $v_{min}\Delta t + \frac{1}{2}a_{max}\Delta t^2 \leq s$.

4.(currently amended) The modeling machine of claim 1, wherein the dispensers ~~are~~ comprise thermally conductive tubular members that terminate in a common nozzle and further comprising:

a thermally conductive body in which the dispensers are carried; and

a means carried by the body for heating the dispensers to a temperature at which the first and second materials are flowable.

5.(currently amended) The modeling machine of claim ~~4~~ 1, wherein ~~each of the dispensers comprise an elongated tubular member that terminates in~~ a common nozzle ~~which~~ carries both of the tips.

6.(original) The modeling machine of claim 1, wherein the dispensers are thermally conductive and further comprising:

a thermally conductive body in which the dispensers are carried;

a thermal insulator positioned in the body so as to provide thermal separation between the dispensers;

a means for heating the first dispenser to a temperature at which the first material is flowable; and

a means for heating the second dispenser to a temperature at which the second material is flowable.

7.(original) The modeling machine of claim 6, wherein the thermal insulator comprises ambient air that fills a cavity in the body.

8.(original) The modeling machine of claim 6, wherein the thermal insulator comprises a solid material.

9.(original) The modeling machine of claim 6, wherein the road has a thermal diffusivity $\underline{K_e}$, and wherein the minimum transit time is characterized by the relationship $\Delta t = \dfrac{0.3h^2}{K_e}$.

10.(original) The modeling machine of claim 9, wherein the extrusion head accelerates and decelerates through a path comprising multiple vertices and the tips have a minimum vertex velocity $v_{\min}$ and a maximum acceleration $a_{\max}$, and wherein the spacing s is characterized by the relationship $v_{\min}\Delta t + \frac{1}{2}a_{\max}\Delta t^2 \leq s$.

11.(original) The modeling machine of claim 1, wherein the distance s is at least 0.02 inches.

12.(currently amended) ~~In a~~ A modeling machine of the type which builds three-dimensional objects by depositing thermally solidifiable modeling material as a road of molten material having a height *h* into a build environment having a temperature lower than an extrudate temperature of the material, and from an extrusion head that moves at a known speed in a predetermined cross-sectional pattern, ~~the improvement~~ comprising:

a first supply of a first thermally solidifiable modeling material, in the form of a continuous filament;

a second supply of a second thermally solidifiable modeling material, in the form of a continuous filament;

a third supply of a third thermally solidifiable modeling material, in the form of a continuous filament;

a first dispenser carried by the extrusion head and having an inlet for receiving ~~a~~ the first supply of the first thermally solidifiable modeling material and a tip for dispensing roads of the first material in molten form, the tip of the first dispenser having a downward face positioned in approximately a z-plane;

a second dispenser carried by the extrusion head and having an inlet for receiving ~~a~~ the second supply of the second thermally solidifiable modeling material and a tip for dispensing roads of the second material in molten form, the tip of the second dispenser being maintained in a fixed vertical position relative to the tip of the first dispenser, and having a downward face spaced apart a distance *s* from the face of the first dispenser and positioned in approximately the same z-plane as the face of the first dispenser; and

a third dispenser carried by the extrusion head and having an inlet for receiving ~~a~~ the third supply of the third thermally solidifiable modeling material and a tip for dispensing roads of the third material in molten form, the tip of the third dispenser being maintained in a fixed vertical position relative to the tips of the first and second dispensers, and having a downward face spaced apart a

distance s_1 from the face of the first dispenser and a distance s_2 from the face of the second dispenser and positioned in approximately the same z-plane as the face of the first and second dispensers;

wherein the distances s, s_1 and s_2 are each great enough that a road deposited by one of the three tips will shrink due exclusively to cooling in a minimum transit time Δt between the depositing tip and either of the other two tips, such that none of the tips will drag across and smear the road.

13.(original) The modeling machine of claim 12, wherein the road has a thermal diffusivity K_e and wherein the minimum transit time between any two of the tips is characterized by the relationship

$$\Delta t = \frac{0.3h^2}{K_e}.$$

14.(original) The modeling machine of claim 13, wherein the extrusion head accelerates and decelerates through a path comprising multiple vertices and the tips have a minimum vertex velocity $v_{\min}$ and a maximum acceleration $a_{\max}$, and wherein the distances s, s_1 and s_2 are characterized by the relationship $v_{\min}\Delta t + \frac{1}{2}a_{\max}\Delta t^2 \leq s, s_1$ and s_2,

15.(original) The modeling machine of claim 12, wherein the distances s, s_1 and s_2 are each at least 0.02 inches.

16.- 21. (canceled).

22.(new) <u>The extrusion apparatus of claim 12, wherein the tips extend from a common nozzle.</u>

23. (new) A method for building a three-dimensional object in a modeling machine of the type which builds three-dimensional objects by depositing thermally solidifiable modeling material as a road of molten material having a height *h* into a build environment having a temperature lower than an extrudate temperature of the material, and from an extrusion head that moves at a known speed in a predetermined cross-sectional pattern, the method comprising:

providing a first supply of a first thermally solidifiable modeling material in the form of a continuous filament to a first dispenser carried by the extrusion head, the first dispenser having an inlet which receives the first supply of the first thermally solidifiable modeling material and a dispensing tip which has a downward face positioned in approximately a z-plane;

providing a second supply of a second thermally solidifiable modeling material in the form of a continuous filament to a second dispenser carried by the extrusion head, the second dispenser having an inlet which receives the second supply of the second thermally solidifiable modeling material and a dispensing tip maintained in a fixed vertical position relative to the tip of the first dispenser, the dispensing tip of the second dispenser having a downward face spaced apart a distance *s* from the tip face of the first dispenser and positioned in approximately the same z-plane as the tip face of the first dispenser;

dispensing roads of the first material in molten form from the tip of the first dispenser;

dispensing roads of the second material in molten form from the tip of the second dispenser; and

controlling the velocity of the extrusion head such that a trailing one of the first and second dispensers lags behind a leading one of the first and second dispensers by no less than a minimum transit time Δt, defined as the time for a road deposited by the leading dispenser to sufficiently shrink due exclusively to cooling so that the tip of the trailing dispenser does not drag across and smear the road.